

DL/05/S

Digital Lever Probe



user manual



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2.0: Safety Summary

Terms in this Manual

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.



Symbols in this manual

This symbol indicates where applicable cautionary or other information is to be found.

WARNINGS:

Do not operate in explosive atmosphere

To avoid explosion, do not operate this equipment in an explosive atmosphere.

NOTES:

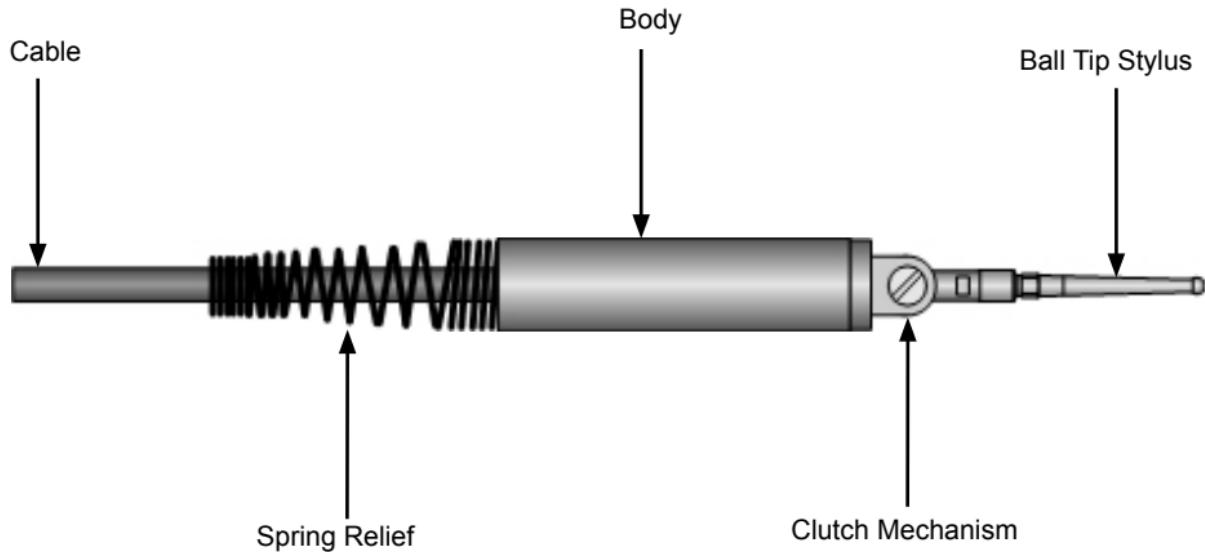
This equipment contains no user serviceable parts

This equipment must be returned to your Solartron dealer for all servicing and repair.

Low Voltage

This equipment operates at below the SELV and is therefore outside the scope of the Low Voltage Directive.

3.0: Components of the Lever Probe



4.0: Care of the Lever Probe

Care should be taken during installation to avoid dropping the probe or subjecting it to severe shock loads.

To minimise transducer failure due to cable damage, cable runs should be positioned well clear of moving components and vulnerable working areas. If the cable is in a flex situation, then a minimum bend radius of 150mm should be maintained.

5.0: Mechanical Installation

The majority of problems experienced with applications and use are totally avoidable, particularly if sufficient thought is given to the positioning and clamping methods employed.

5.1: Positioning

The Lever Probe is susceptible to some degree to the influence of magnetic fields and should therefore be positioned well away from electric motors, relays and permanent magnets.

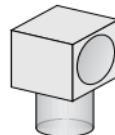
Where this is not possible, magnetic shielding should be considered as an alternative.

5.2: Mounting

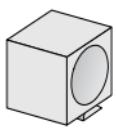
The Lever Probe can be mounted directly into a 9.52mm hole. If a high force is applied to the probe casing, performance may be affected. Ideally, probes should be clamped in a yoke, split or collar clamp. If single point screw clamping is adopted, then the maximum tightening torque applied should be 0.26Nm.

Alternatively, mounting can be achieved using the 8mm peg mounting block or the industry standard dovetail mounting block.

The small notch at the front of the probe can be utilised to mount the probe in the correct attitude. This notch is in the same plane as the stylus movement.



8mm Peg Mount
Part Number 804919



Dovetail Mount
Part Number 804920

5.3: Cable

The Lever Probe cable is custom made to achieve the optimum balance between flexibility, flex life, chemical resistance, abrasion resistance and electrical screening.

To minimise transducer failure due to cable damage, cable runs should be positioned well clear of moving components and vulnerable working areas. If the cable is in a flex situation, then a minimum bend radius of 150mm should be maintained.

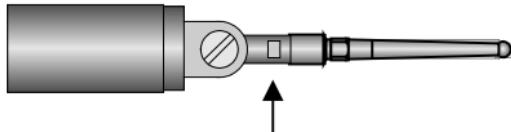
If a cable is damaged, it is not possible to repair it without affecting the probe calibration. The cable must be replaced.

5.0: Mechanical Installation (continued)

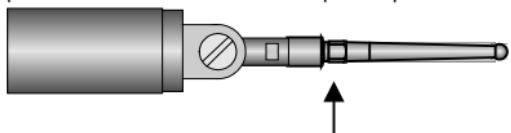
5.4: Stylus Replacement

Stylus Removal

- 1) Grip the shaft shown below with the spanner supplied.



- 2) Using a pair of soft jaw pliers, grip the tip shaft. Turn the pliers anti-clockwise to loosen the probe tip.



- 3) Continue to unscrew the probe tip anti-clockwise, until the tip has been removed.



Stylus Installation

- 1) Attach the tip by screwing (clockwise) into the transducer until it is "finger tight".



- 2) To secure the tip, apply a torque of 6 to 8 cNm.



CAUTION

Overtightening of the stylus may cause damage to the probe. Care must be taken when gripping the shaft to avoid damaging the mechanism.

5.0: Mechanical Installation (continued)

5.5: Side Load

Care must be taken to minimise any side load applied to the stylus. Excessive side loads may cause damage to the Lever Probe.

These side loads can generally be avoided by careful consideration to the use of the probes. Figures 1, 2 and 3 demonstrate this.



CAUTION

Excessive side loads may cause damage to the Lever Probe



Figure 1

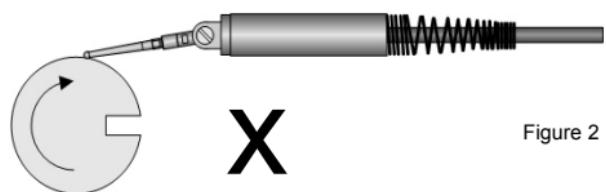


Figure 2

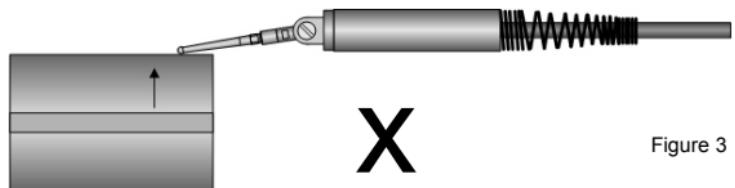


Figure 3

6.0: Use of the Lever Probe

6.1: Cosine Error

As with other lever-type transducers, the Lever Probe is subject to a common source of error called Cosine error.

Cosine error occurs when the stylus is not set in the proper relationship to the part. The stylus should be set parallel to the part surface, so that its movement is essentially perpendicular to the part (see figure 4). This is usually easy to arrange, because the stylus is held in place by a friction clutch, and can be readily adjusted even if the body of the Lever Probe is at an angle to the part (see figure 5).

When the stylus is at an angle to the part (see figure 6), the contact tip is displaced across the part surface as the dimension varies. This increases the apparent deviation from nominal. The steeper the angle, the greater the cosine error.

Depending upon the tolerances involved and the critical nature of the measurement, the angle of the contact arm to the part may be estimated by eye.

Cosine error can be removed using the scaling function of the DR600, or in the computer operating software.



Figure 4 - No Cosine Error

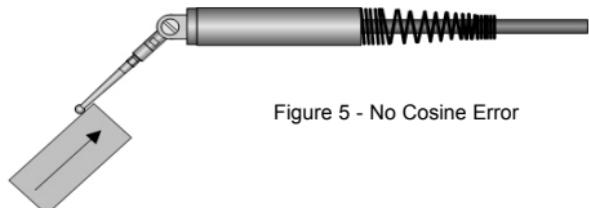


Figure 5 - No Cosine Error

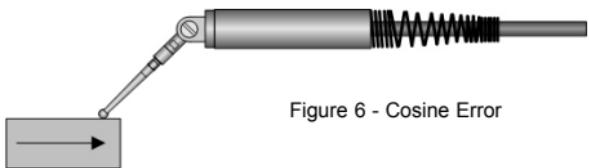


Figure 6 - Cosine Error

7.0: Specifications

7.1: Measurement

	DL/05/S
Mechanical Travel	0.6mm
Measurement Range	0.5mm
Start of Measuring Range	20 μm to 30 μm from limit stop
Stylus Adjustment	180°
Accuracy (with measurement contact normal to the axis of the stylus)	± 0.1 micron + D x 0.2% (where D is distance from setting master)
Repeatability	<0.15 μm on axis <0.3 μm cross axis
Hysteresis	<0.25 μm
Resolution	User Selectable to <0.01 μm
Measurement Bandwidth	Programmable from 6 Hz to 460 Hz
Reading Speed	Up to 3906 readings/second (Dynamic Measurement Mode)
Tip Force	Options for 5g to 30g in 5g increments
Temperature Coefficient	0.1 $\mu\text{m}/^\circ\text{C}$
Life	Better than 5 million measuring cycles (dependent on application)

Accuracies quoted are through the gauge centreline

7.0: Specifications (continued)

7.2: Mechanical

	DL/05/S
Mass	<15 g (<0.033 lbs)
Material of Frame	Stainless Steel
Mounting	Direct clamping into 9.52 mm hole Mounting blocks for 8 mm peg mount and industry standard dovetail available as accessories
Stylus	Available with ball diameters of 0.38mm, 0.79mm, 1.58mm & 2.54mm Mounting thread 1-72 UNF

7.3: Environmental

	DL/05/S
Storage Temperature	-20°C to +85°C
Operating Temperature	0°C to +60 °C
Shock	To maintain best performance, the lever probe should be protected from shock and dropping

7.0: Specifications (continued)

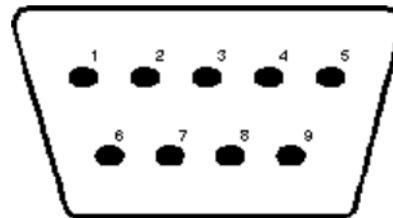
7.4: Electrical Interface

	DL/05/S
Energising Voltage	5 V \pm 0.25 Vdc (Powered from Orbit Network)
Energising Current	55 mA (at 5 Vdc) (Powered from Orbit Network)
Interface	Orbit Network

8.0: Connections

PIE Pin assignment

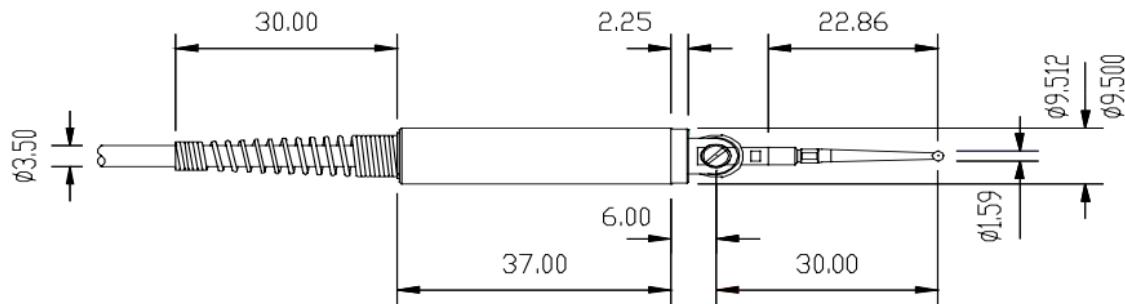
Pin	Function
1	(none)
2	RS485(A)
3	RS485(B)
4	0V
5	0V
6	+5V
7	+5V
8	+5V
9	0V



PIE can be fitted directly into the back of the Digital Readout or linked into the 'Orbit' Network using the stackable T-CON connectors..

9.0: Outline Drawings

9.1: Mechanical Drawings



CAD drawings can be downloaded from
www.solartronmetrology.com.